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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,828	10/31/2003	Guy Maring Lohman	ARC920030024US1	1285

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EXAMINER

SOMMERFELD, PAUL J

ART UNIT	PAPER NUMBER
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2168

DATE MAILED: 04/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/698,828

Applicant(s)

LOHMAN ET AL.

Examiner

Paul J. Sommerfeld

Art Unit

2168

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15, 17 and 18 is/are rejected.
- 7) ☒ Claim(s) 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 9/9/2004.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Remarks***

1. As per the Preliminary Amendment filed 5/20/2004, claims 1, 2, 6, 8, 17, and 18 are amended.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-5, 10-15, 17, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Kabra et al (Kabra, Navin and DeWitt, David J., "Efficient Mid-Query Optimizations of Sub-Optimal Query Execution Plans", June 1998, ACM Press, pp. 106-117).

As to amended claims 1, 17, and 18, Kabra et al teaches a computer-implemented method for accelerating database query processing (p. 106 col. 2 lines 42-45), comprising:

determining during execution of a particular query whether continued execution of a particular query execution plan is worthwhile by

calculating the amount of query execution remaining (p. 110 col. 2 lines 32-33, p. 107 col. 1 lines 39-42);

computing the difference between estimated optimization parameter values and actual optimization parameter values to determine the significance of parameter estimation errors (p. 106 col. 2 lines 48-54);

concluding that continued execution is not worthwhile if a significant amount of query execution remains and significant parameter estimation errors have occurred (p. 111 col. 1 lines 36-50); and

if continued execution is not worthwhile, then suspending query execution, re-optimizing the query, and restarting query execution with a re-optimized query plan (p. 110 col. 1 lines 15-17).

As to amended claim 2, Kabra et al teaches generating a number of alternative query execution plans, including plans generated with and plans generated without using temporary results computed in prior executions (p. 110 col. 1 lines 15-20, generating an alternative query execution plan without using temporary results. p. 110 col. 1 lines 30-42, generating an alternative query execution plan using temporary results);

assigning a cost to each alternative plan that reflects plan optimality (p. 110 col. 2 lines 41-42); and

choosing the optimal alternative as the re-optimized query plan (p. 111 col. 1 lines 1-2).

As to claim 3, Kabra et al teaches exploiting actual optimization parameter values during the re-optimizing (Kabra et al p. 110 col. 1 lines 2-4).

As to claim 4, Kabra et al teaches the actual optimization parameters include at least one of: cardinality, memory, communication costs, and I/O operations (Kabra et al p. 108 col. 1 lines 10-11).

As to claim 5, Kabra et al teaches selectively reusing materialized partial query results during subsequent re-optimizations and query executions, if the reuse reduces overall computational costs (p. 110 col. 1 lines 30-42).

As to claim 10, Kabra et al teaches placing a number of checkpoints in the query execution plan to compute the difference between estimated optimization parameter values and actual optimization parameter values (Kabra et al p. 107 col. 1 lines 45-51).

As to claim 11, Kabra et al teaches the checkpoints are placed at points in the query execution plan where an entire intermediate result is materialized before proceeding with further operators in the plan (Kabra et al p. 112, col. 1 lines 3-4).

As to claim 12, Kabra et al teaches an explicit materialization is added to the query execution plan, just before the checkpoint, to materialize the intermediate result (Kabra et al p. 108 col. 1 line 43 through p. 108 col. 2 line 1).

As to claim 13, Kabra et al teaches the checkpoint is pushed below a materialization point for subsequent execution (Kabra et al p. 107 col. 1 lines 45-51).

As to claim 14, Kabra et al teaches buffering rows until the checkpoint is evaluated, enabling pipelining with some delay (Kabra et al p. 108 col. 1 line 43 through p. 108 col. 2 line 1, materialized intermediate results are equivalent to a buffer of rows, since both are a collection of rows produced before evaluating a checkpoint).

As to claim 15, Kabra et al teaches exhaustion of temporary space triggers a re-optimization instead of signaling an error (Kabra et al p. 109 col. 1 lines 20-26).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kabra et al (Kabra, Navin and DeWitt, David J., "Efficient Mid-Query Optimizations of Sub-Optimal Query Execution Plans", June 1998, ACM Press, pp. 106-117) as applied to claim 1 above, and further in view of Ives et al (Ives, Zachary G.; Florescu, Daniela; Friedman, Marc; Levy, Alon; and Weld, Daniel S., "An Adaptive Query Execution System for Data Integration", June 1999, ACM Press, pp. 299-310).

As to amended claim 6, Kabra et al does not explicitly teach selectively retaining temporarily materialized views storing partial query results until a lazy removal condition occurs, said conditions including (a) updating of at least one table contributing to a materialized view, and (b) determining that new storage space is needed for other materialized views.

Ives et al teaches selectively retaining temporarily materialized views storing partial query results until a lazy removal condition occurs, said conditions including (a) updating of at least one table contributing to a materialized view, and (b) determining that new storage space is needed for other materialized views (p. 304 col. 2 lines 27-32)

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have modified the method of re-optimizing a query taught by Kabra et al by the method of adaptive query execution taught by Ives et al, because retaining temporarily materialized views until a removal condition occurs enables immediate processing of tuples in the temporarily materialized views (Ives et al p. 304 col. 2 lines 32-33).

6. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kabra et al (Kabra, Navin and DeWitt, David J., "Efficient Mid-Query Optimizations of Sub-Optimal Query Execution Plans", June 1998, ACM Press, pp. 106-117) in view of Bode et al (U.S. Publication 2003/0115187 A1).

As to claim 7, Kabra et al does not explicitly teach returning records at each execution cycle if the records have not previously been returned.

Bode et al teaches returning records at each execution cycle if the records have not previously been returned (lines 13-16 of paragraph [0102], elimination of duplicates).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have modified the method of re-optimizing a query taught by Kabra et al by the teachings of Bode et al, because eliminating duplicates ensures that duplicate records are not presented to the user (Bode et al lines 13-16 of paragraph [0102]).

As to claim 8, Kabra et al, as modified, teaches records returned during previous executions are eliminated from answer sets returned in subsequent executions (Bode et al lines 13-16 of paragraph [0102], elimination of duplicates).



7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kabra et al (Kabra, Navin and DeWitt, David J., "Efficient Mid-Query Optimizations of Sub-Optimal Query Execution Plans", June 1998, ACM Press, pp. 106-117) and Bode et al (U.S. Publication 2003/0115187 A1) as applied to claim 8 above, and further in view of Harada et al (U.S. Publication 2003/0208440 A1).

As to claim 9, Kabra et al and Bode et al do not explicitly teach the returned records are identified by a unique derived record ID assigned to records during query execution.

Harada et al teaches the returned records are identified by a unique derived record ID assigned to records during query execution (lines 11-12 of claim 25).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have modified the method of re-optimizing a query taught by Kabra et al and Bode et al by the method of assigning identifiers to records taught by Harada et al, because assigning identifiers to records enables retrieval of the records (Harada et al lines 11-12 of claim 25).

#### ***Allowable Subject Matter***

8. Claim 16 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
  - U.S. Publication 2005/0033730 A1, issued to Chaudhuri et al, for teaching a method of optimizing a query in phases.
  - U.S. Publication 2005/0177557 A1, issued to Ziauddin et al, for teaching a method of detecting a runaway query and re-optimizing the query at execution time.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul J. Sommerfeld whose telephone number is 571 272-6545. The examiner can normally be reached on M-F 7:45 am - 4:15pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim T. Vo can be reached on 571 272-3642. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Tim Vo', with a large, sweeping initial stroke.

**TIM VO**  
**PRIMARY EXAMINER**